

**Defining New Productivity Measures for Service and Network-
Based Firms**

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of
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Certification

This thesis is submitted in fulfilment of the requirements of the degree of PhD at the University of Technology Sydney Business School, Management Discipline Group. This represents the original work and contribution of the author, except as acknowledged by general and specific references within the dissertation.

I hereby certify that this thesis has not been submitted for a higher degree to any other university or institution.

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Abstract

Historically, productivity has been defined as a measure of an economic system's allocation of resources. However, because world economies have transitioned from agriculture and manufacturing to service and knowledge-based industries, and work practices from single firm production units to more networked organisations, the relevance and measure of productivity is debatable. Services differ from goods production, and the differences go beyond characteristics to the underlying logic of how value is created. The difficulties in qualifying and quantifying intangible inputs and outputs lead to the research question: how can productivity be measured for service and network-based firms?

The focus of this research is on the development of two contemporary models, namely the Service Enterprise Productivity in Action (SEPIA) and Networked Enterprise Productivity in Action (NEPIA) models, which address the gaps and limitations in current models and which are able to be operationalised.

As this research is at the forefront of productivity for service and network-based firms, it uses two methodologies. Data is collected from a set of heterogeneous firms operating in the Australian travel and tourism industry. Data envelopment analysis (DEA) is used for the SEPIA model, measuring inputs and outputs of three of the five stakeholders, namely customers, employees, managers, suppliers and shareholders. The inclusion of stakeholders positions productivity and the firm in a social domain. Consequently, social network analysis (SNA) is used to explore productivity measures for network-based firms—that is, service value networks.

The contribution from this research is the alignment of firm level data for service and network based firms with the existing methods of calculating productivity at an industry and economy level. In addition productivity for service firms is found to be multi-layered. New forms of efficiency have been identified, namely integrative efficiency and collaborative efficiency having particular relevance for service and network based firms. The SEPIA and NEPIA provide a framework and roadmap that can be used to further collaborative research into productivity, for service and network-based firms.

Dedications

In dedication to Jai Waters

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List of Research Publications

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Book chapters

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Referred conference papers

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Other academic and industry publications

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Baker, K & Scerri, M 2014, *Cradle coast destination management plan: towards 2020*, SEPIA Consulting, Sydney.

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Scerri, M & Agarwal, R 2010, “Yield management in education”, Paper presented to the *The 4th International Conference on Operations and Supply Chain Management*, Hong Kong.

Academic presentations

Scerri, M 2014, “A generalised approach to measuring service productivity”, Paper presented at the *Early Researcher Workshop* to the *10th Asia Pacific Productivity Conference*, Brisbane.

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List of Abbreviations

ABS	Australian Bureau of Statistics
AQF	Australian Qualification Framework
ANZSIC	Australian and New Zealand Standard Industry Category
ATM	automatic teller machine
B2B	business-to-business
B2C	business-to-consumer
B2G	business-to-government
DEA	data envelopment analysis
FTP	file transfer protocol
G2C	government-to-citizen
GDP	gross domestic product
ICT	information communication technology
IO-VRS	input oriented-variable returns to scale
TCP/IP	transport control protocol/internet protocol
MS	mass service
NEPIA	Networked Enterprise Productivity in Action
OECD	Organisation for Economic Co-operation and Development
PS	professional services
RFID	radio frequency identification
SCOR	Supply Chain Operations Reference
SEPIA	Service Enterprise Productivity in Action
SF	service factory
SNA93	Standard National Accounts
SPM	Service Process Matrix
SS	service shop
USDOT	US Dictionary of Occupational Title
WTP	willingness to pay